Automotive Supply Chain and Logistics 2018

CONTENTS

CONTENTS

02

Key Trends in the Automotive Supply Chain

This section will examine:

- How and why automotive supply chains have become more complex
- The international nature of supply chains and the role of emerging markets
- How complexity in supply chains has been facilitated by visibility tools
- The implications of the re-negotiation of NAFTA and Brexit for vehicle manufacturers
- Why costs have risen although remained static as a proportion of COGS
- Growing awareness of supply chain risk.

The automotive supply chain and logistics industry has undergone a period of significant change over the recent past and in the coming years may become unrecognisable, driven by trends often referred to as 'Industry 4.0'.

These trends include the likely widespread adoption of electric vehicles (EVs) with all the attendant disruption which this will have on engine production and spare parts logistics, to name just two key areas. In 5-10 years' time automotive supply chains are likely to look very difficult, although with the billions of dollars already invested in existing plants and production processes, change may be slower than many believe.

Future scenarios for the automotive supply chain and logistics industry are dealt with elsewhere in this report. This section will focus on many of the key trends which are impacting upon the industry right now, which, even without the influence of 'Industry 4.0', are hugely significant in their own right.

2.1 SUPPLY CHAIN COMPLEXITY

Since Ti published its first report on the Automotive Logistics industry in the mid-2000s, supply chains have become much more complex. Part numbers have proliferated due to the increasing variety of models, new plants and the development of emerging countries as major consumer markets.

This has also increased the complexity of logistics systems and flows required to support these strategies especially on an international basis. For some Vehicle Manufacturers (VMs) who use global component suppliers, regional logistics networks in Asia and Latin America serve to consolidate shipments before they are shipped to plants in Europe or North America. In the case of Ford, for example, logistics providers consolidate parts for its Romanian assembled 'Ecosport' model in India, Brazil, China and Thailand before they are shipped to the port of Constanta and then moved overland to Craiova to a de-consolidation centre.

Whilst inbound logistics for European and North American plants has become more internationalized, not least due to higher levels of high tech components imported

03

Electric Propulsion & Electronic Guidance Technologies: The Impact on Logistics & Supply Chain Management

The nature of the transformation in the car industry has, perhaps, become clearer over the past year. Yet it remains far from certain what the nature of road vehicles will be in ten years. In summary, it might be suggested that there could be three areas of major change:

- Materials; reduction in the use of steel and greater use of carbon fibre.
- Electric propulsion; partly or wholly relying on batteries and electric motors for propulsion
- Electronic guidance; electronic sensors and artificial intelligence guiding the vehicle, either partly of wholly.

3.1 MATERIALS

Less talked of than autonomous guidance or electric propulsion, the use of different materials for the construction of the 'frame' of the car; that is the body-work/chassis, is very likely. Certain manufacturers such as Jaguar-Land Rover already use aluminium construction although most VMs at present use steel alloy to deliver a lighter vehicle. The renewed importance of power-weight ratios will amplify the need for materials with better performance than steel. Carbon Fibre is likely to play an important role in this.

The consequence for both in-plant logistics and the supply chain are likely to be substantial:

- The nature of the 'frame-shop' will change, with less or no welding activity.
- The feeding of steel coil will reduce or disappear.
- Carbon fibre fabrication facilities will have to be created, feeding assemblies into the main assembly plant. These are likely to be adjacent to the main assembly plant.

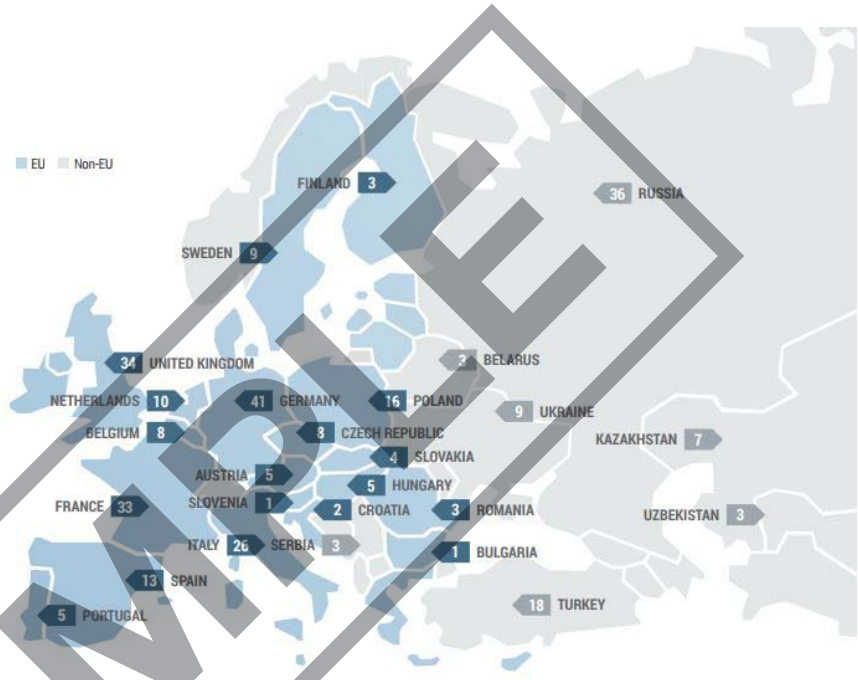
Scheduling such facilities might become an important pivot in the automotive supply chain as carbon fibre is difficult to work with.

Other materials, notably plastic, are likely to continue to be used for non-frame applications and are much easier to source and manufacture.

4.4 LOCATION AND SIZE OF ASSEMBLY PLANTS

Although automotive production is remaining local to large markets, there is also a contrary trend towards larger, more centralised assembly plants. The volumes going through assembly plants have increased generally, to a point that big plants will often have production of over 500,000 vehicles (e.g. Honda at Maryville, OH, or the PSA Peugeot Citroen plants at Mulhouse & Sochoux). The reasons for this are obvious in that bigger plants mean higher economies of scale. However, the trend pulls against both the desire to produce a larger number of different model types and the need to keep production within a currency area. Other industries solve this problem by moving to global production centres; however, the automotive sector uses flexible production techniques (see above) to attempt to deal with this apparent contradiction.

Figure 4.2 Automobile assembly and engine production plants in Europe



Source: ACEA

4.5 THE IMPACT OF NEW PRODUCTION TRENDS ON TRANSPORT DEMAND

All of these developments – flexible production lines, build-to-order systems, leaner production – in automotive logistics over the past twenty years have one thing in common. They increase the demand for transport. The realisation of the cost of inventory, flexible scheduling of production assets and shorter lead times that are characteristic of contemporary logistics operations on the automotive supply side, imply a trade-off between inventory and capital costs against transport costs. Although the dynamics of this trade-off are well known, VMs are reluctant to admit to it. Most will attempt to limit the increase in transport utilisation through new management organisations or new methods of purchasing.

Despite this, the improvements in productivity coming from ideas such as JIT rely on the power of cheap transport. The sourcing of components, aggressive management of inventory and the centralisation of inventory for the aftermarket, all depend on the availability of cheap transport.

Over the past 20 years the production base has shifted out of traditional European, North American and Japanese locations and into regions such as Central Europe, Mexico and above all China. This is increasing the geographical breadth of the production base and amplifying the role of transport. Therefore, although transport is perceived to be a relatively unimportant resource within the automotive industry, it is in fact one of growing influence which is increasingly affecting the nature of production in the sector.

Since Transport Intelligence first used this approach it has discussed cost structures with a number of VMs and has found that the figures produced have a surprising level of accuracy. Some vehicle manufacturers do not have comprehensive figures due to their lack of comprehensive logistics management structures; however, this is changing as logistics continues to become a more important management process.

The drawback and strengths of this model remain. A potential flaw in Ti's approach is that the ICDP model is based on European operations. Batch sizes and transport costs vary between the major production locations, however, the model does measure logistics costs as a proportion of revenue and thus this may compensate to a degree, for example, for the higher batch quantities found in North America.

The bias in these estimates is very likely to be underestimating the size of the market, but within a range of 0-10%.

The market sizes provided are estimates of the spending on outsourced logistics services by both vehicle manufacturers and component suppliers.

The estimates themselves are divided-up into 'Inbound', 'Spare parts' and 'Finished Vehicle'.

The definitions of these categories are:

- Inbound – spending on the logistics into and within the assembly plant of the VM. Includes activities such as the 'milk round', consolidation, and sequencing.
- Spare parts – spending on the provision of spare parts for aftermarket logistics.
- Finished Vehicle – vehicle manufacturer's finished vehicle operations including transport, handling/

7.2 GLOBAL

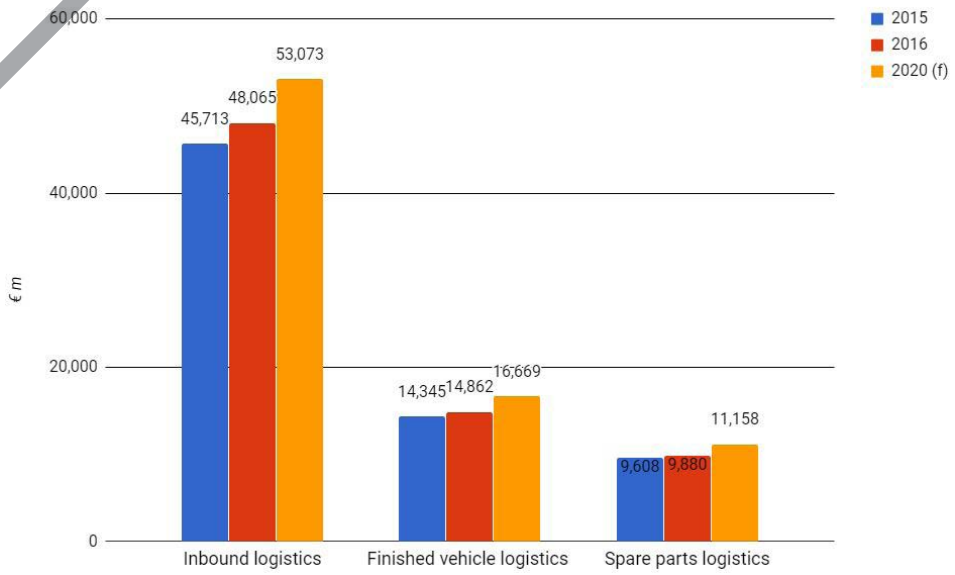
Ti estimates that the total global automotive logistics market was worth €243,746m in 2016. The global outsourced automotive logistics market grew by 4.5% in real terms in 2016 and was worth €72,807m.

The inbound logistics market is the largest sub-segment of the outsourced automotive logistics market and is valued at €48,605m. This market grew by 5.1% in real terms in 2016. The finished vehicles logistics market grew by 3.6% and was valued at €14,862m. The spare parts logistics market grew by 2.8% and was valued at €9,880m.

Ti expects the global outsourced automotive logistics market to grow at a real 2016-2020 compound annual growth rate (CAGR) of 2.7%. By 2020, this will mean the market is valued at over €80bn. The fastest growing segment will be spare parts (CAGR of 3.1%), followed by finished vehicle logistics (2.9%) and inbound logistics (2.5%).

Growth in 2016 was largely driven by a strong year for the Chinese market. However, over the forecast horizon, China's growth is expected to slow quite considerably. Europe's 2016-2020 CAGR of 2.5% is also slower than its 2016 growth rate of 2.9%. In North America, the market shrank by 0.6% in 2016, but is expected to grow at a real 2016-2020 CAGR of 0.8%.

Chart 7.1 Global Outsourced Automotive Logistics Market Size



Source: Ti

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